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ITHACA, NEW YORK
March, 1930
Vol. II Fasc. III

GENTES HERBARUM

Art. 5. Hosta
Art. 6. Hemerocallis

VOL. II ITHACA, NEW YORK FASC. III

GENTES HERBARUM

(The Kinds of Plants)

By L. H. BAILEY

5. Hosta: the plantain-lilies
6. Hemerocallis: the day-lilies

Published
(Mailed at Ithaca Post Office to regular list)
March 8, 1930

FIG. 65. HOSTA JAPONICA.—The Aletris japonica of Thunberg 1780, and Hemerocallis japonica of Thunberg 1784. Upsala.

Ed.
L. H. Bailey
Ithaca, New York
4-29-30

HOSTA AND HEMEROCALLIS

Two groups of hardy herbaceous long-lived perennials have been so long in cultivation in northern gardens that the planter has come to take them as a matter of course, without much questioning as to the identities or knowledge of their nativities and origins. Yet these common plants are not clear as to kinds and derivation. They have partaken of the general neglect in which cultivated plants have lain, and familiarity with them has largely taken them out of the range of inquisitiveness. For more than ten years the present writer has grown and studied these plants, so far as they are in cultivation, with a view to more accurate description, and this report is the first result. The account of Hosta begins on this page, and the treatment of Hemerocallis on page 143.

ARTICLE 5. HOSTA: THE PLANTAIN-LILIES

The plants discussed in this article are the plantain-lilies, well known in gardens for their foliage and bloom but which are astonishingly confused as to names. They are perennials of eastern Asia, with no close allies in the flora of North America. They make attractive formal clumps or stools of abundant radical leaves somewhat like those of the broad-leaved plantains but in larger dimensions. The lilac, blue, and white flowers are borne in summer and autumn on scapes or peduncles that mostly surpass the foliage. The plants are fully hardy in the northern United States. Mostly they are known as species of Funkia, but Hosta is now the accepted name to those who follow the International Rules of nomenclature, and they have been placed in Niobe under the operation of the American Code since by that codex Hosta is untenable as explained later in this paper.

The botanical history of the plantain-lilies begins with the Swede, Karl Peter Thunberg (1743-1828), pupil of Linnæus and successor to him at Upsala, who made a memorable journey to Japan as well as to the Cape of Good Hope. In 1780 he published a plant as *Aletris japonica* in Nova Acta Regiæ Societatis Scientarum Upsaliensis. The description is very brief, which, being translated, states that the plant is acaulescent, with ovate-lanceolate petioled seven-nerved leaves, and spicate flowers. He does not mention the color of the flowers, but in all the narrow-leaved species of this genus they are light lilac, sometimes almost white.

In 1784 in his historic Flora Japonica Thunberg describes *Hemerocallis japonica*. Here he does not mention his *Aletris japonica* of four years earlier although he uses the same words in describing the leaves. It has been supposed that here he had in mind another plant, the one we now know as *plantaginea* (or *subcordata*), but this is not the case, even though

this error persists until recent time. Thunberg here states that the flowers are white, as they are in *plantaginea* alone in the genus; but the pale lilac flowers of plants with narrow (ovate-lanceolate) leaves may after a time appear to be white on the herbarium sheet, as I can testify from some of my own specimens. There are other elements in the description in Flora Japonica against the assumption that he meant *plantaginea*, as the drooping short-tubed (unguicularis) flowers and exserted anthers; and if he had intended the very marked *plantaginea* he would have been obliged to write

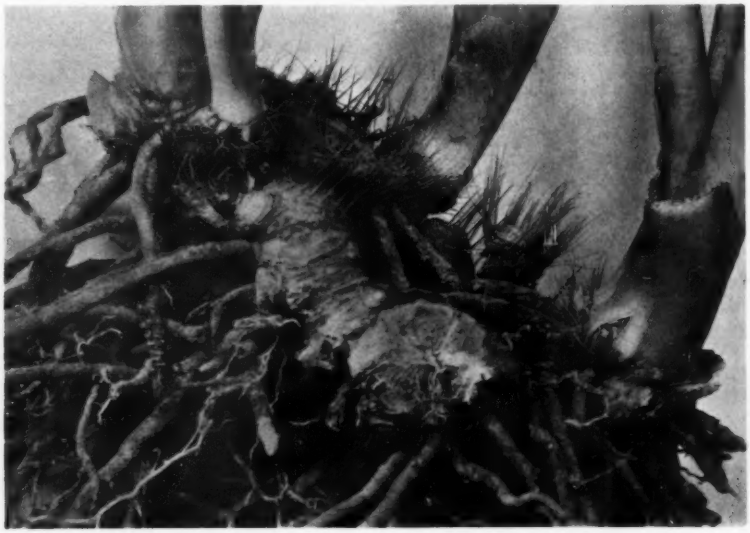


FIG. 66. THE ROOTSTOCKS of Hosta cærulea.

a different description. Fortunately we can appeal to his herbarium, and through the courtesy of Dr. Nils E. Svedelius of Upsala I have a photograph of his plant, the sheet written "Hemerocallis japonica" by Thunberg. Fig. 65 is an engraving made from this photograph. This is the plant to which we must attach the name *japonica*, with whatever generic word it is associated.

It is important that we have the identification of *japonica* clear, for Thunberg subsequently changed his mind about the application of the name. In those days there were no technical standards of nomenclature, and botanists were as free to employ names at their pleasure as are some of the plant-growers of our time. A good example of this old privilege are the Thunbergian transfers in the Mondos (or Ophiopogons) detailed in my paper on those interesting plants (Gent. Herb. ii, fasc. 1).

In 1791 appeared a volume of pictures of plants drawn long before that time by the Dutch traveler Engelbert Kaempfer, published from the originals in the British Museum under the auspices of Sir Joseph Banks. In this collection of drawings is a plate of a very different "Hemerocallis japonica", without authority or description. The name was probably on the authority of Thunberg, to whom these illustrations must have been known, for three years later, in the Transactions of the Linnean Society, we find Thunberg transferring his name *japonica* to the plant of Kaempfer, and proposing the name *Hemerocallis lancifolia* for his *H. japonica* of the Flora of Japan, 1784. In these days of rules and codes we cannot accept this procedure, and must employ *japonica* in its original sense and *lancifolia* becomes a synonym of it. Now, it has been supposed that the plant of Kaempfer's drawing is *plantaginea*, and citations have been made on this understanding; but it is not that plant, and I think it the same as the species later figured and briefly indicated by Loddiges in his Botanical Cabinet as *Funkia Sieboldtiana*, and this is the conclusion at which the late George V. Nash arrives in his valuable study of these plants in Torreya, January, 1911.

Up to this time the plantain-lilies had been known as Hemerocallis, the genus we now reserve for the yellow day-lilies. It soon began to be felt, however, that they are too distinct to be associated with that genus. In 1807 Salisbury made a suggestion of *Saussurea* for them, but that name had already been applied under a slightly different spelling to other plants, although it has been brought forward by Otto Kuntze as late as 1891 for the plantain-lilies. In 1812 Trattinnick proposed the name *Hosta* for the plantain-lilies, and this name is retained by the International Botanical Congress of Vienna; there is an earlier Hosta but as it is a dead name no useful purpose would be served in displacing Trattinnick's. The name Hosta was definitely accepted by Engler in Die Natürlichen Pflanzenfamilien in 1888; also by Voss in Siebert and Voss' Blumengaertnerei which is the German edition of Vilmorin-Andrieux et Cie., Les Fleurs de Pleine Terre, 1906, but spelled *Hostia*. In the year 1812 Salisbury made another excursion into this group and proposed two generic names, *Niobe* founded on *Hemerocallis japonica*, Thunb., and *Bryocles* founded on *Hemerocallis cærulea*. What he meant by "Hemerocallis Japonica Thunb." is disclosed by the brief description and by his citation of tabula 1433 of the Botanical Magazine: this portrait is there called *Hemerocallis japonica* but it is the plant we now know as *plantaginea*; we have no evidence that Thunberg knew this species. It is not without reason that Salisbury proposed different genera for the two plantain-lilies he knew, dedicating the long-flowered waxy-white big-bracted very fragrant species to the mythological Niobe, and the blue-flowered short-tubed one theretofore known as *cærulea* to Bryocles. Salisbury had a habit of making species-names for occasions

even though the plants had older ones; thus he renames his *japonica* plant *cordifolia* (*Niobe cordifolia*), and the other one *Bryocles ventricosa* because of the suddenly swollen or ventricose flower-tube. The names Niobe and Bryocles were taken up by Baker more than sixty years ago as sections in the genus Funkia; and to this sisterhood I now add a third, Alcyone, to organize the genus into its proper parts.

In 1817 Kurt Sprengel published the name Funkia for these plants, in his Anleitung zur Kenntniss der Gewächse, second edition. This name became current, sometimes spelled Funckia and Funkea, and held until displaced some twenty-five years ago by Hosta, a name that long lay in obscurity.

Under the American Code of nomenclature there cannot be two identical generic names even

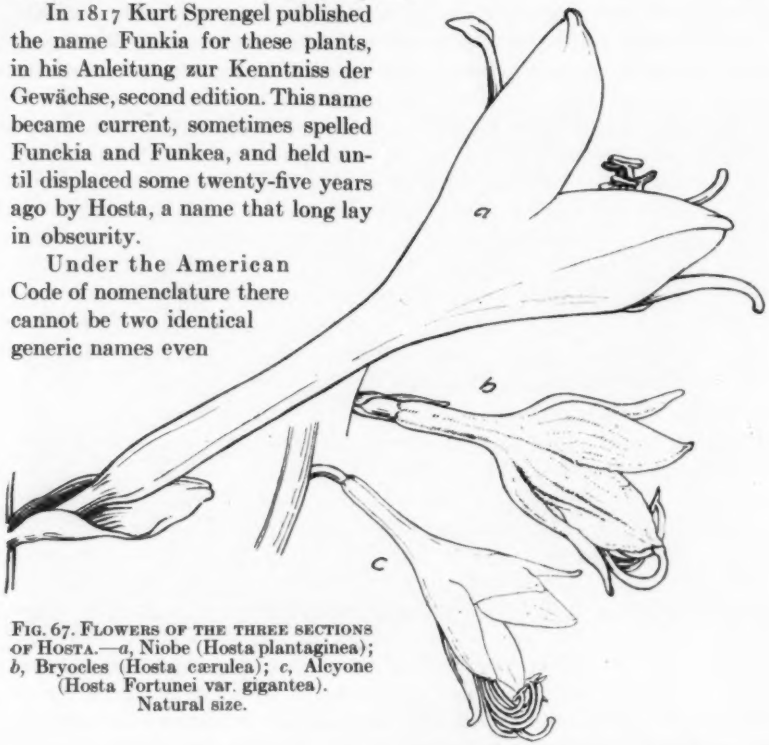


FIG. 67. FLOWERS OF THE THREE SECTIONS OF HOSTA.—*a*, Niobe (Hosta plantaginea); *b*, Bryocles (Hosta cærulea); *c*, Alcyone (Hosta Fortunei var. gigantea). Natural size.

though the older one of them be unused or invalid; therefore under that regulation Trattinnick's *Hosta* disappears and either *Niobe* or *Bryocles* comes up. These two genera of Salisbury are proposed on the same page of the Transactions of the Horticultural Society of London, but *Niobe* is placed first. Thus if either of the Salisbury names is taken up for the plantain-lilies it must be Niobe, other considerations being equal, although it is almost violence to make this name cover all the species since the author reserved it in particular for the one peculiar plant now known to us as *plantaginea* and which has only rather remote relationship with the others. Many genera have been separated on fewer characters than this species presents.

There are other elements in the nomenclatorial history of the plantain-lilies, but we may let them rest and proceed to a preliminary examination of the species and groups known to be in general cultivation, although there are certain ones grown in North America that cannot yet be identified. These plants have not been bred as much as have the day-lilies and are apparently represented in gardens in approximately their natural states, and yet we shall find that the botany of them is perplexed. Even as to the wild native plants it is evident from the scant and poorly named specimens in herbaria that the genus needs a thorough overhauling, with newly collected and annotated material. Most of our knowledge of these plants is derived from cultivated stocks.

In this paper I have not attempted to place the botanical or Latin-named varieties of the old literature of which I have not seen specimens or have not observed in cultivation. It is quite impossible to place them from the imperfect descriptions. Thus such names as *marginata*, *albo-picta*, *maculata*, *argenteo-variegata*, *aureo-maculata*, *variegata*, *ramosa*, may not belong with the species to which they have been assigned. It is not often that we are able to check them as directly as in the case of *Funkia Sieboldiana variegata*, which the colored plate in Lowe and Howard "Beautiful Leaved Plants" discloses to be *Hosta undulata*.

There are three old formal treatments of all the species of Hosta (or Funkia) known at the time of the compilations. The first is by C. S. Kunth in the fourth volume of his Enumeratio Plantarum, 1843. He recognizes five species. The second is by F. A. W. Miquel in 1869 in Verslagen en Mededeelingen der Koninklijke Academie van Wetenschappen (Amsterdam) with the observations in Dutch. This paper appeared also in the same year in Archives Néerlandaises des Sciences Exactes et Naturelles (The Hague) with the observations in French. A briefer treatment by him had appeared (1866-67) in his Prolusio Floræ Japonicæ. These papers by Miquel appear to have been overlooked by subsequent students of the genus. I regret that I have not examined his material, if it exists. The third exposition is by J. G. Baker in Volume xi of the Journal of the Linnean Society, Botany, 1871. To these three should be added the newer treatment by Nash, already mentioned, in Volume xi of Torreya, January 1911, in which the generic name Niobe is revived and extended to the whole genus.

In his paper of 1869 Miquel cites many names of Funkia from the manuscript and catalogue (Catal. horti Acclim.) of Siebold. These names were apparently never published by Siebold and therefore are botanically known only by the citations in Miquel. I have not seen the catalogue to which reference is made; but in "Extrait du catalogue et du prix-courant des plantes du Japon et des Indes-orientales et occidentales néerlandaises cultivées dans l'etablissement de Von Siebold & Comp. à Leyde" in

Jaarboek van de Koninklijke Nederlandsche Maatschappij tot Aanmoediging van den Tuinbouw, 1848, are listed the Sieboldian names *Funkia cucullata, lanceolata, grandiflora, maculata, marginata, undulata* with natural height of plant and price, the names being all strictly *nomina nuda*; and *F. spathulata* "fol. albo marg." which is also a *nomen nudum*.

Before proceeding to a critical separation of the species of plantain-lilies attention should be directed to certain marks of differentiation, particularly as between Niobe, Bryocles and Alcyone. The root-system is to be noted. In *H. plantaginea* and *H. cærulea* the plant makes a shallow knobby branching rootstock, bearing large scars bordered with sheath

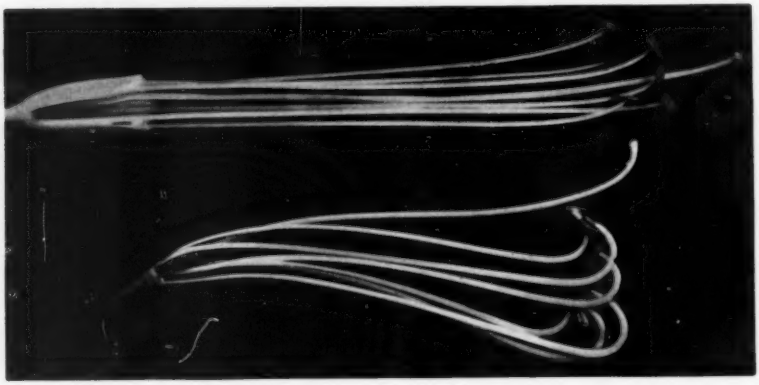


FIG. 68. STAMENS AND PISTIL IN HOSTA.—Hosta plantaginea above, H. Fortunei var. gigantea below. (× 1).

bristles: this is seen in Fig. 66. In the other species such rhizomes may not be formed, or not to so great extent, and the thick roots arise more nearly from the more or less bristled crown. The genus presents three classes of flowers, as to direction and to shape of perianth, contrasted in Fig. 67. The flowers of Niobe (*H. plantaginea*) are long-tubular, to 4 inches and more, and they are directed in an ascending or super-horizontal position until anthesis begins to wane. All the other species bear flowers 3 inches or less long, mostly about 2 inches; and they are sub-horizontal or declined, mostly hanging or becoming so. In Bryocles (*H. cærulea* and *H. minor*) the flower-tube is narrowly cylindrical and grooved nearly half the length of the perianth, then suddenly shouldered into an urn-shaped or cup-shaped expansion; this feature is likely to be obscured in the herbarium specimen, and this is probably one of the sources of confusion in the nomenclature. In all the Alcyones the tube gradually widens, making a funnelform-bell-shaped flower. In Niobe alone the long stamens are nearly parallel and little declined at anthesis, and the filaments are adnate to the perianth-

tube for about one-fourth their length: note the photograph, Fig. 68. Some of the plantain-lilies do not bear mature capsules in any of the conditions under which I have observed them; yet the capsules present good characters when produced: Fig. 69. *H. plantaginea* is again very distinct with its long narrow capsule and beaked valves. The shortest and plumpest of them all is the pod of *H. decorata*. Seeds show good differences, as in Fig. 70. The long slender pointed seeds of *plantaginea* may be compared with the broad obtuse ones of *cærulea* and the smaller ones of the Alcyones.

FIG. 69. CAPSULES OF HOSTA.—*a*, H. plantaginea; *b*, H. cærulea; *c*, H. Sieboldiana; *d*, H. decorata. (× 1).

HOSTA, Trattinnick, Archiv. der Gewächskunde 1, pt. 2. p. 14, nr. 89, with figs. (1812).

Perennial herbs with many strongly veined radical leaves in a clump: scape or peduncle arising from the crown, in most species conspicuous and surpassing the foliage: flowers white or in shades of lilac or blue, trumpet-shaped or campanulate, in a short or open raceme terminating the scape, the perianth-segments 6 and variously united to form a tube; stamens 6, often declinate and projecting, either hypogynous or attached to base of tube: capsule (when produced) an elongated loculicidal 3-valved pod dehiscing from the apex; seeds black or brown-black, flat, thin or winged above base, broad-oblong to linear, imbricated and hanging on either side the placenta in each valve.—Known species 10 to 12 in Siberia, China and Japan, but some of them described only from gardens. With the re-definition of the species one must not accept the cited nativities with too much confidence.

§ 1. NIOBE (*Niobe*, Salisb. Trans. Hort. Soc. Lond. i, 335. 1812; and Gen. Pl. 82. 1866. *Funkia* § *Niobe*, Baker, Journ. Linn. Soc. Bot. xi, 367. 1871). *Flowers long-tubular, to 10 cm. and more, wax-white, strongly fragrant.*

Flowers white, ascending, stamens not prominently declinate and more or less parallel, not protruding, joined to the perianth-tube one-fourth or less their length: capsules narrow, to 7½ cm. long, the valves pointed; seeds long and slim, pointed: flower-bracts broad and herbaceous: rhizomes horizontal, large and clumpy, with prominent scars attended by upright bristles or fringes. 1. *H. plantaginea.*

§ 2. BRYOCLES (*Bryocles*, Salisb. l.c., 335 and 81. *Funkia* § *Bryocles*, Baker, l.c.). *Flowers short and broad, 5 cm., shouldered midway, blue.*

Flowers deep lavender-purple ("blue") and streaked, not fragrant, nearly horizontal at early anthesis then drooping, tube narrow-cylindrical and furrowed in lower part then suddenly nearly squarely enlarging into a broad urn-shaped cup; stamens strongly declined and then up-curving, not attached to tube, more or less protruding: capsules short, clavate-oblong, 3-4 cm. long, the valves bluntish or somewhat apiculate; seeds broad, and obtuse or truncate: flower-bracts not prominent: rhizomes strongly clumpy and horizontal, with large fringed or bristled scars. 2. *H. cærulea.*

§ 3. ALCYONE. *Flowers short, about 5 cm., gradually widening, lilac.*

Flowers lilac to nearly white, not fragrant, nodding or soon becoming so, the perianth gradually widening into a broad-bell-shaped expansion, 4-6 cm. long, lobes prominently acute; stamens strongly declined, up-curving and exserted, not joined to tube: capsules club-shaped to linear, 2-3 cm. long; seeds small as compared with § 1 and 2, various in shape: flower-bracts various but not prominently short-broad and herbaceous: root-system less horizontally rhizomatous in most species and little so in any of them, therefore without big scars or very conspicuous bristles unless about the crown itself.

a. *The japonica group.*—Leaves prominently tapering-acuminate or long-pointed, not glaucous; blades ovate-lanceolate, therefore narrow, twice or more longer than broad, plane or nearly so, nerves 6 or 7 or less either side of midrib. 3. *H. japonica.*

aa. *The Sieboldiana group.*—Leaves broad-ovate often cordate, large, not twice as long as broad, abruptly or gradually pointed, nerves mostly more than 8 either side rib, glaucous or blue-green: scape little if at all leafy.

Scape not exceeding foliage: flowers crowded, narrow. 4. *H. Sieboldiana.*

Scape much surpassing foliage: flowers scattered, wide open. 5. *H. Fortunei.*

aaa. *The undulata group.*—Leaves ovate or oval, not large, pointed or blunt, nerves 7 or 8 either side rib, green variously striped or bordered with whitish or white.

Leaves ovate, pointed and curved with upstanding sides, variously splashed and striped cream-white, markedly undulate: scape conspicuously leafy. 6. *H. undulata.*

Leaves oval, obtuse or essentially blunt, flat, margined white: scape not leafy. 7. *H. decorata.*

1. **Hosta plantaginea**, Aschers. Bot. Zeit. xxi, 53 (1863).
Hemerocallis plantaginea, Lam. Encyc. iii, 103 (1789).
Hemerocallis alba, Andrews, Bot. Repos. t. 194 (1801).

Hemerocallis japonica, Sims, Bot. Mag. t. 1433 (1811).
Niobe cordifolia, Salisb. Trans. Hort. Soc. Lond. i, 355 (1812).
Funkia subcordata, Spreng. Syst. ii, 41 (1825).
Funkia alba, Sweet, Hort. Brit. 409 (1826-7).
Funkia grandiflora, Sieb. & Zucc. in Fl. des Ser. t. 158-9 (1846).
Hosta plantaginea var. *grandiflora*, Aschers. & Graebn. Synops. Mitteleurop. Fl. iii, 54 (1905).
Saussurea plantaginea, O. Ktze. Rev. Gen. ii, 714 (1891).
Niobe plantaginea, Nash, Torreya, xi, 3 (1911).
Funkia japonica, Drude, 2nd. Suppl. Bot. Exch. Club Brit. Isl. Rep. 1916 (1917), as to syn.

FRAGRANT PLANTAIN-LILY (Figs. 67a, 68, 69a, 70a).—Widely spreading, making large circular clumps: leaf-blades broadly cordate- or subcordate-ovate, short-acuminate, to 25 cm. long and 15 cm. broad, bright lively green and glossy both sides, with 7-9 prominent curved nerves on either side; petiole canaliculate, equaling or exceeding the blade: scapes to 75 cm. high, somewhat exceeding foliage, with 1 or 2 small leaves midway and then a large green ovate leafy prominent bract below each flower with sometimes but not always a small bract inside it: flowers in a short crowded terminal raceme, waxy-white and very fragrant, long-funnelform, 10-13 cm. long and 6 or 7 cm. across in expansion, nearly horizontal or ascending at first, hanging when old, appearing in late summer and autumn: capsules frequent, long-cylindrical and pointed, to 7 cm. long and 6 or 7 mm. broad, valves beaked; seeds long and narrow, to 14 mm. long and 4 mm. broad, irregularly tapering to apex.

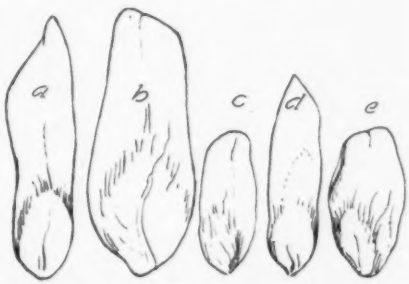


FIG. 70. SEEDS OF HOSTA.—*a*, H. plantaginea; *b*, H. cærulea; *c*, H. japonica var. albo.-marginata; *d*, H. Sieboldiana, *e*, H. decorata. (× 3).

This is the commonest of the cultivated plantain-lilies in the regions I know. It is very unlike the other species, with the long white trumpet-shaped delightfully fragrant ascending autumnal flowers, the elongated fruits and slender seeds. It is still widely known as *subcordata*. The species was founded on plants in cultivation; it is native in China and Japan.

2. **Hosta cærulea,** Tratt. Archiv. Gewächsk. ii, 144, no. 189 (1814).
Hemerocallis cærulea, Andrews, Bot. Repos. t. 6 (1797).
Bryocles ventricosa, Salisb. Trans. Hort. Soc. Lond. i, 335 (1812).
Funkia ovata, Spreng. Syst. ii, 40 (1825).
Funkia cærulea, Sweet, Hort. Brit. 409 (1826-7).
Hosta japonica var. *cærulea*, Aschers. Bot. Zeit. xxi, 53 (1863).

Funkia ovata var. *cærulea*, Miquel, Versl. Konink. Acad. Wetensch. II, iii, 299 (1869); Archiv. Néerl. Sci. Exact. et Nat. iv, 223 (1869).
Saussurea cærulea, O. Ktze. Rev. Gen. ii, 714 (1891).
Niobe cærulea, Nash, Torreya, xi, 7 (1911).

FIG. 71. THE BLUE PLANTAIN-LILY.—Hosta cærulea

BLUE PLANTAIN-LILY (Fig. 71; also 66, 67b, 69b, 71b, 72).—Clump of leaves low, much exceeded by the stout stiff scapes, bearing prominent bristles about the old rootstock scars: leaf-blades broadly cordate-ovate or some of them taper-based, abruptly acuminate-pointed, to 25 cm. long and 20 cm. broad, with about 8 or 9 very prominent and coarse incurving impressed nerves either side the midrib, dull dark green above and glossy green underneath; petiole mostly exceeding the blade, canaliculate: scapes to 1 m. tall to top of raceme, naked or with 2 or 3 remote small bracts: flowers pronounced lavender-purple ("blue"), white-streaked inside, the perianth 5 cm. long and narrow-cylindrical below but abruptly enlarging midway into an urn-shaped expansion, horizontal or nearly so at opening but soon declining and then hanging long in a withered state, appearing in midsummer: capsules abundantly produced and large, 3-4 cm. long and about 5 mm. broad; seeds large and broad, to 15 mm. long and 6 wide, mostly obtuse, broad-ended, or truncate.

This is one of the most marked of the plantain-lilies and need not be confused with any other in cultivation. It has the darkest flowers of any of them. It has persistently and strangely borne the name *ovata*. I have grown it under the trade name *speciosa* and have seen it in a botanic garden as *Fortunei*. Vars. *marginata* and *albo-marginata* are in the literature but I have not seen them; specimens in my collection from a botanic garden under the name *Funkia ovata* var. *marginata* are the white-marginate form of *H. Fortunei*. The species was founded on cultivated plants; it is recorded as native in China, and I have taken it in the wild in central China, in fruit; and also in a yard in bloom, the roots said to have been dug in the wild. Komarov lists it from Manchuria and northern Korea, and Baker records it from eastern Siberia.

There is a second species of the Bryocles group, *H. minor*, but I do not know it to be in cultivation; see page 142.

3. **Hosta japonica,** Voss, Vilmorin's Blumengaertnerei, no. 3405 (1896), as Hostia.

Aletris japonica, Thunb. Nov. Acta Reg. Soc. Sci. Upsal. iii, 208 (1780).

Hemerocallis japonica, Thunb. Fl. Jap. 142 (1784).

Hemerocallis lancifolia, Thunb. Trans. Linn. Soc. ii, 335 (1784).

Hosta lancifolia, Tratt. Archiv. Gewächsk. 1, 55 (1812), as cited.

Funkia lancifolia, Spreng. Syst. ii, 41 (1825).

Funkia ovata var. *lancifolia*, Miquel, Versl. Konink. Acad. Wetensch. II, iii, 300 (1869); Archiv. Néerl. Sci. Exact. et Nat. iv, 224 (1869).

Funkia lanceolata, Sieb. ex Miquel, l.c.

Hosta cærulea form. *lancifolia*, Matsum. Index Pl. Jap. 199 (1905).

Saussurea japonica, O. Ktze. Rev. Gen. ii, 714 (1891).

Niobe japonica, Nash, Torreya, xi, 4 (1911).
Niobe japonica var. *tardiflora*, Nash, l.c.5.
Funkia japonica, Drude, Ind. Suppl. Bot. Exch. Club Brit. Isl. Rep. 1916 (1917), as to cit. Thunb.

NARROW-LEAVED PLANTAIN-LILY (Fig. 65).—Leaf-blades flat (not folded), ovate-lanceolate, very acute, gradually or sometimes rather abruptly narrowed to base, true green, to 10 cm. long and mostly 4 cm. or less broad, with 3 or 4 main nerves either side the midrib, the petiole 15

FIG. 72. CONTRAST IN LEAVES.—Hosta cærulea at right, H. Fortunei var. gigantea at left. (× ¼).

cm. or more long and very narrow (little if at all margined): scapes mostly equaling or exceeding the leaves., to 75 cm. high, slender, bearing 1 or more dry empty bracts below the raceme and sometimes a small leaf: raceme lax and slender, the flowers all well separated, flower-bracts 1½ cm. or less long: flowers in summer and autumn, at first more or less horizontal (sometimes ascending) but soon becoming declined or drooping, lilac (mostly light lilac), on slender pedicels equaling or the upper ones exceeding the bract, about 4 cm. long at full anthesis, tube slender and soon prominently but gradually expanding into a bell-shaped expansion: capsules (when produced) oblong-clavate, about 2 cm. long.

Here is described the slender plant of Thunberg's herbarium (Fig. 65), the account being drawn from abundant garden material for this plantain-

lily is common in cultivation. I have grown it mostly under the trade name *lanceolata*. Sometimes the scapes are as short as the leaves, as in the Thunberg specimen, but commonly they considerably exceed the clump of foliage. I have not seen mature plump seeds, and capsules are rarely produced to full size as far as my observation goes, and Thunberg does not mention fruit. In his Flora Japonica Thunberg gives a considerable range for the wild plant in Japan, and adds that it was often grown in gardens and houses for ornament. It is recorded, also, as native in China, Korea and Manchuria.

FIG. 73. CHARACTERISTIC CLUMP OF SHORT-CLUSTER PLANTAIN-LILY.—Hosta Sieboldiana.

H. japonica var. **albo-marginata,** Voss, Vilmorin's Blumengaertnerei, no. 3405 (1896), as f. *albo-marginata.*

Funckia albo-marginata, Hook. Bot. Mag. t. 3657 (1839).

Funckia ovata var. *albo-marginata,* Miquel, Versl. Konink. Acad. Wetensch. II, iii, 299 (1869); Archiv. Néerl. Sci. Exact. et Nat. iv, 224 (1869).

Hosta japonica var. *albimarginata,* Aschers. & Graebn. Synops. Mitteleurop. Fl. iii, 55 (1905).

Funkia lancifolia var. *albo-marginata,* Bailey, Cyclo. Amer. Hort. 619 (1900).

Hosta cærulea form. *albomarginata,* Matsum. Index Pl. Jap. 199 (1905).

Niobe japonica var. *albo-marginata,* Nash, Torreya, xi, 5 (1911).

Fig. 74. Short-cluster Plantain-lily.—Hosta Sieboldiana. (× about 3/5).

Leaves margined white: plant very fertile, producing abundantly of clavate-oblong capsules to 3 cm. long; seeds about 7 mm. long and 3 mm. broad, mostly obtuse (Fig. 70c).

† **H. japonica** var. **fortis,** var. nov.

Differt a typo majore magnitudine et vigore, majoribus bracteis et similioribus foliis; nervi 6 vel 7; petioli alati; floret æstate.

Plant stouter (*fortis*: strong), with strong scapes much overtopping foliage and bearing larger bracts and often 2 or 3 leaves: leaf-blades mostly broader, often with 6 or 7 veins either side the midrib, passing into a margined petiole: blooms in summer.

Side by side with the slender slim-petioled *H. japonica* this plant looks very distinct, but there are intermediate forms and I think the var. is a developed state of the species, perhaps enlarged and somewhat coarsened by cultivation; yet it is not impossible that another species may be involved in the range of forms. It is common in gardens. I have never seen fruit, although I have watched for it in a hundred-foot border of the plant.

H. japonica var. **tardiflora,** Bailey, Gentes Herbarum, i, 133 (1923). *Funkia tardiflora,* Leichtlin; W. Irving, The Garden, lxiv, 297, with fig. (1903).

Hosta lancifolia var. *tardiflora*, Bailey, Stand. Cyclo. Hort. 1605 (1914).

Funkia lancifolia var. *tardiflora*, Wright, Bot. Mag. 8645 (1916).

Clumps condensed because of the short petioles, which are margined: leaves markedly acuminate-pointed, dark green, of firm texture, the sheaths blotched purple: flowers in dense congested often branched racemes, often as many as 50, sometimes the bracts and scapes, as well as the flowers, light purple, appearing in autumn.

This is a very separate-looking plant and perhaps is a distinct species. I have it in herbarium from abroad but have not seen it in North America. What is with us called *tardiflora*, as far as I have seen, is only *H. japonica*. The contrast in season of bloom is with the large cultivated race here called var. *fortis* and not with *H. japonica* itself. The slender plant named *japonica* by Thunberg blooms from summer till stopped by frost; I have specimens in full bloom dated June 21 from New York City and from Ithaca August 9, 13, 28, 30, September 10, 14, 15, 23, often in more than one collecting. It is interesting to note also that Thunberg in Flora Japonica states that it blooms in August and September.

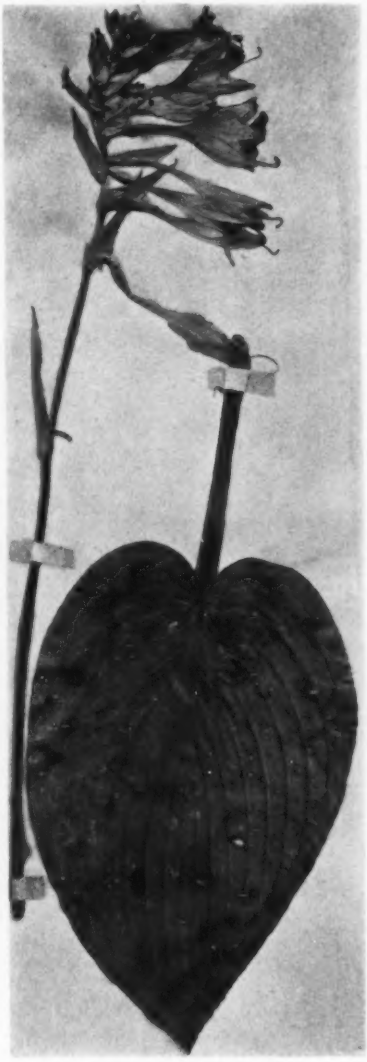


FIG. 75. HOSTA FORTUNEI.—Part of type sheet. Kew. (× 3/5)

4. **Hosta Sieboldiana,** Engler, Naturl. Pflanzenf. II, v, 40 (1888).

Hemerocallis japonica, Ic. Select. Plant. Kaempf. (1791); Thunb. Trans. Linn. Soc. ii, 335 (1794).

Hemerocallis Sieboldtiana, Loddiges, Bot. Cab. t. 1869 (1832).
Funckia Sieboldiana, Hook. Bot. Mag. sub. t. 3663 (1839), as to syn.
Funkia Sieboldi, Lindl. Bot. Reg. xxv, t. 50 (1839).
Funkia glauca, Sieb.; Miquel, Versl. Konink. Acad. Wetensch. II, iii, 303 (1869); Archiv. Néerl. Sci. Exact. et Nat. iv, 228 (1869).
Hosta Sieboldiana var. *glauca*, Makino, Tokyo Bot. Mag. 1902, 173; Obs. Fl. Jap. fasc. 2, 80 (1902).
Saussurea Sieboldiana, O. Ktze. Rev. Gen. ii, 714 (1891).
Niobe Sieboldiana, Nash, Torreya, xi, 6 (1911).

FIG. 76. TALL-CLUSTER PLANTAIN-LILY.—Hosta Fortunei var. gigantea.

SHORT-CLUSTER PLANTAIN-LILY (Figs. 72, 73, 74; also 69c, 70d).—Robust but not tall-growing plant, forming large clumps of bold foliage that equals or exceeds the scapes and therefore more or less conceals the flowers: leaf-blades broadly cordate-ovate, to 36 cm. long and 25 cm. broad, shortly acuminate-pointed, with curved nerves very prominent particularly underneath and 6-15 either side the rib, variously glaucous, more or less undulate; petiole little if at all exceeding the blade, canaliculate:

scapes stout, 25-40 cm. high to top of raceme, commonly bearing one or more small leaves and very prominent long-lanceolate pointed bracts: flowers in a short rather dense sometimes aggregated raceme, hanging, faint lilac to almost white, perianth 4-5½ cm. long and narrow-tubular and slender-tapering to base and not expanding widely, remaining long in a withered state, appearing in late spring and early summer: capsules freely produced, narrow-cylindrical, to 3 cm. long and less than 5 mm. thick (Fig. 69); seeds narrow and pointed (Fig. 70), to 12 mm. long and 3 mm. broad.

It is very difficult to typify *Hosta Sieboldiana*. The name starts with Loddiges, 1832, in Botanical Cabinet, without botanical description. We must draw the character from the colored plate, t. 1869. The leaf is very broad, like that of the plant we now associate with the name, and the blue-green coloring is apparently an attempt to represent glaucosity. From the flowers alone I would not be so sure of the identity. We next come to Hooker's *Funckia Sieboldiana* in Botanical Magazine t. 3663; I cite him for the name only, and because he cites Loddiges; but it is doubtful whether the plate represents the plant of Loddiges, particularly as he says nothing about glaucousness. There are elements in the plate and text that raise doubts. The contemporaneous plate of Lindley in Botanical Register 25:50 is a good presentation of the flowers of the plant we now take for *Sieboldiana*, and the leaf is not out of character. Like Hooker's plant, it is very low; these novelties were mostly grown under glass. Perhaps the best of the historic pictures is the *Hemerocallis japonica* of Kaempfer's Icones, 1791, but of course the name is antedated. Kunth in 1843 merely copied Hooker from Botanical Magazine, adding a diagnosis of Lindley's plant in a foot-note. It remained for Baker in 1871 and 1876 to define *Sieboldiana* as we now understand it. The species was similarly understood by Nash as evidenced by his description of it in Torreya, 1911, p. 6 and also by specimens in my possession from his plants.

We are now ready to consider *Funkia glauca* of Miquel, 1869. He says it is very distinct from *Sieboldiana* in the stronger and more numerous nerves in the leaf, shorter peduncle, more fascicled flowers, intense glaucousness of foliage, and other characters. The leaves of *Sieboldiana* are described as grass-green. It is significant that he cites Siebold's Catalogue name *F. viridis* as a synonym of *Sieboldiana*, showing that a green-leaved plant was in mind. He was describing the plant of Hooker. Miquel states that *Sieboldiana* has 12-18 nerves in the leaf whereas *glauca* has 25-31. It is true that the early pictures of *Sieboldiana* show relatively few nerves, but not the largest leaf would likely be chosen for representation on a plate, even if all the plates were the same plant. I find the whole range as to number of veins in leaves from one plant of the Loddiges-Lindley-Baker *Sieboldiana*.

The name *Sieboldiana* originates from cultivated plants. We do not know whether Kaempfer's drawing labelled *Hemerocallis japonica*, 1791, was made from wild or planted material. The species is accredited to both Japan and China.

This plant, *Hosta Sieboldiana*, as I accept it, makes an unusually attractive dense foliage mound. The glaucous broad leaves, short scape, very light-colored closely placed flowers are characteristic. At Ithaca, New York, it blooms in late June and early July.

FIG. 77. CONTRAST IN PARTI-COLORED LEAVES.—Hosta undulata at right, H. decorata left. (× ¾).

5. **Hosta Fortunei,** Bailey, Stand. Cyclo. Hort. 1604 (1915).

Funkia Fortunei, Baker, Gard. Chron. n.s. vi, 36 (1876).

Funkia Sieboldiana var. *Fortunei*, Gaerdt in Wredows Gartenfreund 17. Aufl. 448 (1886).

Hostia Sieboldiana f. *Fortunei*, Voss, Vilmorin's Blumengaertnerei, no. 3403 (1896).

Hosta Sieboldiana var. *Fortunei*, Aschers. & Graebn. Synops. Mitteleurop. Fl. iii, 54 (1905).

Niobe Fortunei, Nash, Torreya, xi, 7 (1911).

TALL-CLUSTER PLANTAIN-LILY (Fig. 75).—Plant often confused with *H. Sieboldiana* but readily recognized when growing side by side because of the smaller less glaucous leaves and the less glomerate racemes of bluer flowers standing far above the foliage and the perianth wide-opening; leaf-blades rather narrowly cordate- to subcordate-ovate and pointed, to 13 cm. long and 9 cm. broad, somewhat undulate, with 10-12 strong nerves either side midrib, thinly but permanently glaucous or blue-green as if glaucous; petiole equaling or exceeding blade, canaliculate, sometimes passing gradually into the blade: scapes to 50 cm. long to top of raceme, with a few narrow long-pointed bracts below the flowers and those in the raceme of the same character but smaller: flowers pale lilac, horizontal to inclined, well separated as the raceme lengthens.

The type specimens of *H. Fortunei* are at Kew and through the cooperation of Director Arthur W. Hill I have had opportunity of examining them. One of them is shown in Fig. 75. Baker describes the petiole as only 2-3 inches long, but on one of his specimens they are twice or more the length of the blades. In the above diagnosis I have followed rather closely the dimensions given by Baker, and I have grown plants of such character but have not seen fruit nor does Baker describe it.

I have also grown fruitful plants much more robust, and these may be designated

H. Fortunei var. **gigantea,** Bailey, Stand. Cyclo. Hort. 1604 (1915).
Figs. 76, 67c.
Funkia gigantea, R. de Noter in Revue Horticole, n.s. v, 391 (1905), and Hort., presumably.

Larger and stouter plant: leaves more prominently pointed, to 25 cm. long and 14 cm. broad: flowers in a longer heavier raceme and mostly relatively less elevated above foliage although the scape may rise to 1 m.: capsules cylindrical, to 3 cm. long; seeds narrow, tapering above to acute, to 10 mm. long and 3 mm. broad.

The plant in my garden from which Fig. 76 is taken blooms in July. It has leaves bluish-green above as if glaucous and slightly if at all rubbing off, more evidently glaucous and somewhat rubbing off underneath. The *Sieboldiana* from which Fig. 73 is taken has leaves decidedly glaucous and rubbing off above, and markedly white-glaucous and easily rubbing off underneath. The plant seen in Fig. 76 has a dense close nest of very short rhizomes constituting the root-crown, with many bristles of old scape-sheaths.

† **H. Fortunei** var. **marginato-alba,** var. nov.

Leaves broadly and irregularly margined with white.

There is a company of green-leaved plants in the gardens very like *H. Fortunei,* on the identity of which I am in doubt. Ordinarily the leaf-blades are not markedly cordate and they may taper into a winged petiole.

Perhaps we have one species varying from "conspicuously and persistently glaucous" (as Baker writes of *Fortunei*) to plain green. I have not seen fruits of these green plants. In this green-leaved group probably belongs the *Funckia Sieboldiana* of Hooker shown in t. 3663 of Botanical Magazine; also *Funkia ovata* var. *intermedia*, Baker, Journ. Linn. Soc. Bot. xi, 368, a photograph of the type specimen being before me. Baker's plant (var. *intermedia*) is from Hokodadi, Japan; it lacks radical leaves, but they can be supplied in cultivated material. Probably *Hosta Sieboldi-*

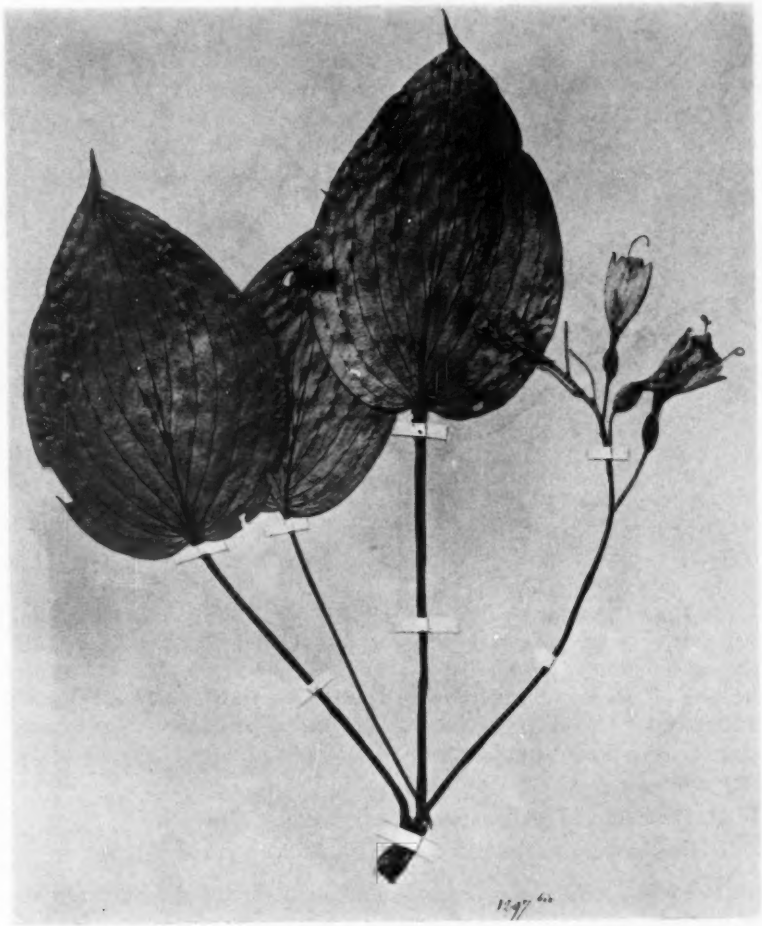


FIG. 78. HOSTA LONGIPES.—Type specimen of Funkia longipes, Franchet & Savatier. Paris

ana var. *nigrescens*, Makino, Tokyo Botanical Magazine, 1902, and Obs. Fl. Jap. fasc. 2, 81 (1902), is also of this group, to judge from the description of the darkish-green leaves and the portrait in Iinuma's Somoku-Dzusetsu of Kuro-giboshi, t. 27, pt. vi, vol. ii.

The nativity of *Hosta Fortunei* and its forms is undetermined, the species and varieties having been founded on cultivated plants. It is undoubtedly Japanese.

6. **Hosta undulata,** Bailey, Gentes Herbarum, i, 133 (1923).

Funkia undulata, Otto & Dietrich, Allgemeine Gartenzeitung, i, 119 (1833).

Hemërocallis undulata, Sieb. apud Miquel, Versl. Konink. Acad. Wetensch. II, iii, 300 (1869); Archiv. Néerl. Sci. Exact. et Nat. iv, 224 (1869).

Funkia ovata var. *undulata*, Miquel, Prolus. Fl. Jap. 317 (1866-7).

Hostia japonica f. *undulata*, Voss, Vilmorin's Blumengaertnerei, no. 3405 (1896).

Funkia lancifolia var. *undulata*, Bailey, Cyclo. Amer. Hort. 619 (1900).

Hosta lancifolia var. *undulata*, Bailey, Stand. Cyclo. Hort. 1605 (1915).

Niobe undulata, Nash, Torreya, xi, 5 (1911), and var. *variegata*, p. 7.

Hosta cærulea form. *undulata*, Matsum. Index Pl. Jap. 199 (1905).

Wavy-leaved Plantain-Lily (Fig. 77).—Plant with low white-and-green foliage which is usually much overtopped by the scapes: leaf-blades ovate and rather abruptly acuminate-pointed, undulate and more or less curved and trough-like so that they do not press flat, to 15 cm. long and 8 cm. broad, with 6-8 nerves either side the rib, unequal at base and passing into a winged petiole that often does not exceed the blades, variously splashed lengthwise with broad stripes of cream-white: scapes to 75 cm. high, bearing several white-splashed pointed curved leaves, raceme lax, bracts prominent and pointed and the lower ones leafy: flowers light lilac, expanded part broad bell-shaped, to 5 cm. long.

This is probably a cultigen, but said by Otto & Dietrich to come from Japan. I have seen specimens taken in a garden in Chekiang Province, China. The authors of the species knew only the splash-leaved form, and I have seen none other although I am told that green-leaved races occur (see *H. Fortunei*). The authors did not describe fruit of it. I have never seen capsules, and have so far been unable to produce them by pollination from another plant of the same or from another species, but my efforts have not been many. The leafy scapes are characteristic. I have photographs of authentic herbarium material, kindly supplied by Dr. R. Pilger, of plants grown in the Berliner Botanischen Gartens and taken in 1841 and

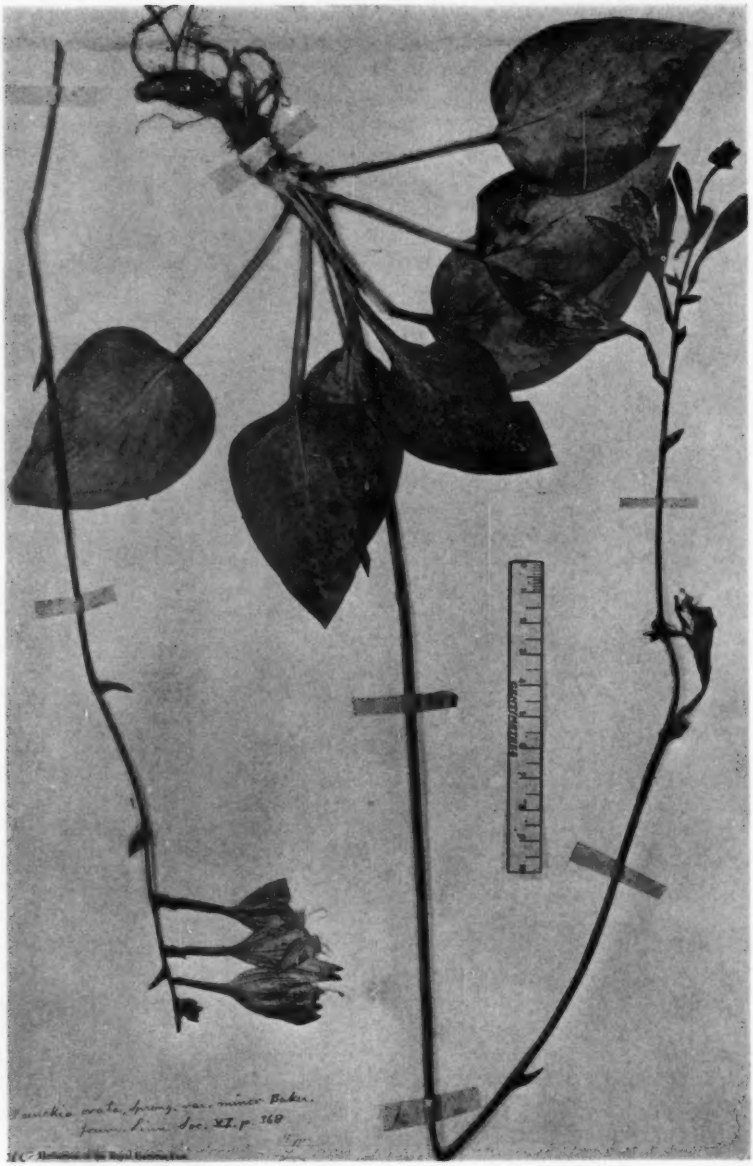


FIG. 79. HOSTA MINOR.—Type specimen of Funkia ovata var. minor. Kew.

1844: it is precisely the splash-leaved plant we understand as *H. undulata*. I have grown the plant under the trade names *Funkia variegata* and *F. robusta fol. var.* The state with a single stripe or band in the center of the leaf (*univittata*) is not essentially different from the usual race.

† 7. **Hosta decorata,** sp. nov.

Folia ovalia, obtusa vel paenissime obtusa, albo-marginata, multo breviora quam scapus; petiolus late alatus; bracteæ breves et latæ et pæne obtusæ; capsula brevis crassaque; semina latissima.

BLUNT PLANTAIN-LILY (Figs. 69d, 70e, 77).—Compact plant with mostly oval obtuse or blunt white-margined flat not curved leaf-blades that are sometimes only 4 or 5 cm. long but ranging to 15 cm. long and 9 cm. broad, with about 5 strong veins either side the rib, rather broad and unequal at base and commonly suddenly contracted into a broad winged petiole which may not much exceed the blade: scape overtopping the foliage, often thrice as tall, mostly 50-60 cm.: flowers rather dark lilac, large, to 5 or 6 cm. long and very broad; bracts prominently broad, obtuse or only short-pointed: capsules abundantly produced, short, clavate-oblong, 2-2½ cm. long; seeds broad, blunt or rounded, to 7 mm. long and 4 mm. broad.

The origin of this plant is unknown to me. I have grown it many years mostly under the name "Funkia Thos. Hogg", and I have supposed it to be one of the introductions of Thomas Hogg who last century had a nursery in New York City and brought numerous plants from Japan, where he had resided. It has been called also *Hosta undulata* var. *marginata*. It is the only blunt-leaved plantain-lily that has come to my attention. It has a very distinct appearance; it is apparently little related to *H. undulata*.

There is another Funkia Thos. Hogg in the literature: see R. de Noter in Revue Horticole, 1905, p. 391 (n.s. vol. v), "F. alba Thomas Hogg, Hort. Japon." It has pure white very large and very fragrant flowers. This plant is undoubtedly *Hosta plantaginea*.

OTHER SPECIES OF HOSTA

We may now take account of other species described in Hosta or Funkia but not known to be in cultivation in North America.

1. *Funkia Argyi*, Léveillé in Memorie della Pontifica Accademia Romana dei Nuovi Lincei, Roma, xxiv, 350 (1906). China. The species is described with linear grass-like leaves. The type specimen is in the herbarium of the Royal Botanic Garden, Edinburgh, and by the kindness of William Wright Smith, Regius Keeper, I have had an opportunity to examine it. The plant is the tuberose, *Polianthes tuberosa*.

2. *Hosta latifolia*, Matsum. Index Pl. Jap. 200 (1905).
Funkia latifolia, Miquel, Versl. Konink. Acad. Wetensch. II, iii, 302, and Archiv. Néerl. Sci. Exact. et Nat. iv, 227 (1869).

The identity of this plant is unknown to me; it is apparently not taken up by writers subsequent to Miquel except that it is listed under Hosta by Matsumura in Index Plantarum Japonicarum, 1905, without diagnosis. Miquel, who of course did not know Baker's *F. Fortunei*, states that it differs from *Sieboldiana* by the deep green leaves, absence of leaves on the much longer peduncle, and other characters. The petioles are margined; the blades are broad-ovate and rather abruptly short-acuminate, with 16-18 nerves that are upstanding underneath. In the observations in the French account the leaf-blades are said to measure 7½-9 inches long,—"9-7½ pouces de long sur 6½ lignes de large"; I do not know the significance of "6½ lignes", for that would give the leaf the impossible dimension of about ½ in. broad if the equivalent of English lines is meant. In the Dutch account they are described as "9-7½ duim lang, 6½ breed zijn", which, together with the other characters, makes a leaf like that of *Hosta cærulea*. It is not the leaf of *H. Sieboldiana* and *H. Fortunei*.

The description of flowers is significant. The perianth is deep blue, with an angulate-cylindrical tube abruptly expanded into a campanulate limb: "perigonii saturate coerulei tubo cylindrico-angulato abrupte in limbum campaniformen. . . ." This again suggests *H. cærulea*, among the kinds known to me.

Miquel mentions three varieties, presumably horticultural, known by the color and markings of the foliage.

3. *Funkia Legendrei*, Léveillé in Fedde, Repertorium novarum specierum regni vegetabilis, vii, 339 (1909). China. Described as resembling *F. ovata* and *F. subcordata* (*Hosta cærulea*, *H. plantaginea*), differing in large flowers and character of the large foliaceous bracts.

4. *Hosta longipes*, Bailey, Stand. Cyclo. Hort. 1605 (1915).
Funkia longipes, Franchet & Savatier, Enumeratio Plantarum Japonicarum, ii, 82, 529.
Hosta Sieboldiana var. *longipes*, Matsum., Cat. 203 (1886); Index Pl. Jap., 201 (1905).

This species is founded on Savatier's collection no. 1297 bis, in Japan. By the cooperation of M. Henri Lecomte of the Jardin des Plantes, Paris, I am able to present a photograph of this type specimen (Fig. 78). It is unlike any other Hosta I know, and it is doubtful whether the portrait of Iwa-giboshi in Somoku-Dzusetsu, cited by Franchet & Savatier, is the same plant. I have specimens of a plant grown abroad as *Funkia longipes* but it is very different from the Savatier specimen, itself being a plant I do not recognize but of the *japonica* relationship.

5. *Hosta minor*, Nakai, Journal of the College of Science, Imperial University of Tokyo, xxxi, 251 (1911), excl. syn. *longipes*.
Funkia ovata var. *minor*, Baker, Journ. Linn. Soc., Bot., xi, 368 (1871).

In elevating the var. *minor* to specific rank, Nakai cites *Funkia longipes* as a synonym. Baker's type of var. *minor*, at Kew, is a very different plant from *longipes*, as may be seen by Figs. 78 and 79. I have not seen a plant like it in cultivation. Baker's specimen is from Korea. I have taken the plant in the wild in the Lu-shan mountains, Province Kiangsi, central China. It is a second species of the section Bryocles; whether more than a distinct form of *H. cærulea* must await further collecting.

ARTICLE 6. HEMEROCALLIS: THE DAY-LILIES

As to nomenclature, the day-lilies begin with the first edition of Species Plantarum in 1753. At that time Linnæus described three plants under the name Hemerocallis,—*H. Lilio-Asphodelus* var. *flavus* and var. *fulvus*, and *H. Liliastrum*. Nine years later in his second edition the first two became respectively *Hemerocallis flava* and *H. fulva*, and they retain these names to this day; the third species became *Anthericum Liliastrum*, and subsequently under another hand it was placed in a separate genus, *Paradisea*, where it now rests. No other species were added by Linnæus. Material representing *Hemerocallis flava* and *H. fulva* is still preserved in the herbarium of Linnæus and through the courtesy of the Secretary of the Linnean Society I have photographs of it, but there is no need to reproduce them inasmuch as they raise no questions; and these two species are too well known to require contemporaneous illustration here.

A third day-lily was added in 1768 by Philip Miller in the eighth edition of his great Gardeners Dictionary, *Hemerocallis minor*. Here the status of the genus practically remained until Morren described *H. Dumortierii* in Horticulteur Belge in 1834, and Trautvetter & Meyer founded *H. Middendorffii* in an account of travels in Siberia in 1856. No other species were added to the genus until near the close of the past century. About a dozen species are now known, some of them having been described recently.

Although certain of the day-lilies have long been residents of gardens, the critical study of the genus is very recent and the systematology of the species is yet only imperfectly understood. The common cultivated *H. fulva* is infertile, never yielding seed-pods unless hand-crossed with other species or from imported indigenous stocks of itself. The stock in general cultivation is supposed to be an original plant multiplied asexually through the centuries. In recent time hand-crosses have been raised from various species and some of them are very attractive, but it is not known to what extent, if any, the different species have crossed under general garden conditions. The identity of the species and races will not be clearly made out until the native plants of Siberia and eastern Asia are carefully studied. In this country investigations have been under way for some years with both imported and domestic stocks at the New York Botanical Garden, where A. B. Stout has made many contributions to the subject, including sterilities, description of the cultivated ones, as well as to the production

of horticultural kinds.* A prominent account of the day-lilies from the horticultural point of view is Circular No. 42 of the United States Department of Agriculture, November 1928, by B. Y. Morrison. These showy plants are now receiving more attention, here and abroad, than ever before.

The distinguishing marks between the species of day-lilies lie not alone in stature, season of bloom, and flower color. Good characters of separation are in the root-systems, in the mode of inflorescence, length of perianth-tube, shape of segments or petals, position of flower or the way in which it stands, and in the seed-pods and seeds when they are produced. One group, comprising only *Hemerocallis Dumortierii* and *H. Middendorffii*, is distinctly separated by bearing the flowers nearly or quite within broad based involucre-like bracts. In the present paper only the eight species known to me in general cultivation in North America are described. There is no attempt to cover all the horticultural variants and hybrids. If the botanist or gardener will give attentive attention to the contrasts separating the species in the key presented herewith he should thereafter be able to place any of the species of day-lilies he is likely to see in gardens into their proper groups, and even the hybrids should disclose their relationships.

FIG. 80. HEMEROCALLIS DUMORTIERII.—Part of Morren's original plate, 1834.

Apparently no practicable key has been constructed for the known species of Hemerocallis. For this effort one must know the living plants, inasmuch as herbarium specimens, unless unusually well prepared, do not disclose the essential characters. The garden species are here arranged in a key; and for the sake of completeness the five other species known to

* Following is the list of Dr. Stout's papers, appended for the aid of persons who may wish to study the day-lilies: Sterility and Fertility in Hemerocallis, Torreya, xxi, 57-62 (1921). The New Day-Lilies, Journal New York Botanical Garden, xxvi, 169-178 (1925). The Capsules, Seeds and Seedlings of the Orange Day-Lily, Journal of Heredity, xvii, 243-249 (1926). New Day-Lilies for the Flower-Garden, House and Garden, Jan. 1929. The Charms of the Modern Day-Lilies, House and Garden, May 1929. The Fulvous Day-Lilies, Journal New York Botanical Garden, xxx, 129-136, 185-194 (1929). Addisonia, xiv, No. 14, June 1929, presenting descriptions and plates of eight species of Hemerocallis; to be continued soon in another issue of Addisonia. Day-Lilies for Your Garden, Ladies' Home Journal, Jan. 1930.

me from the literature or herbarium specimens are given a tentative place. If these other species come into general cultivation we shall probably find them exhibiting a natural variation that will demand considerable change in key contrasts.

The observer of the day-lilies must first of all recognize the two groups, distinguished by the extent and mode of flower-bearing. The greater number of the species fall into the section or group I have called the Euhemeras, of the dichotomous or forking type, represented or suggested in some of the pictures (as in Figs. 82, 84); the Dihemeras, representing the aggregate or capitate type are well seen in two of the historic pictures reproduced in Figs. 80 and 81; also in Fig. 85. Of the Euhemera section there is the dwarf group, with one species supposed to be long in cultivation; and the tall group with six species; and the talls readily divide themselves into the yellow-flowered kinds and fulvous-orange kinds.

With these explanations, we are ready to explore the day-lilies; and I trust the excursion may not be unprofitable.

FIG. 81. FLOWER-BEARING OF THE DIHEMERAS.—The involucre-like bracts (flowers being removed); from Regel's plate of Hemerocallis Middendorffii, 1866.

HEMEROCALLIS, Linnæus, Sp. Pl. 324 (1753); Gen. Pl. Ed. v, no. 391 (1754).

Strong clump-forming long-lived glabrous herbaceous perennials with more or less thickened roots, elongated ensiform or linear radical leaves with strong rib, and yellow, orange, tawny or fulvous large showy often fragrant campanulate or lily-like mostly day-open flowers on scapes that for the most part are dichotomous-branched near top: perianth-segments 6, narrow, joined below into a very short or a prominent narrow tube, the limb longer and mostly wide-spreading and often recurving: stamens 6, inserted in the throat, little or much visible when the flower is full open, the filaments slender, anthers narrow: style single, long and slender, protruding, the stigma small and capitate: capsule oblong to globose, dry, 3-valved, loculicidal, often not produced in cultivated stocks; seeds more or less globular or obovoid.—About a dozen species central Europe to China and Japan, sometimes naturalized.

§ 1. EUHEMERA. Scape forked or branched at or toward the top so that the flowers are separated from each other and variously pedicillate.

a. The dwarf Euhemeras: plants low, 60 cm. or less tall, the scapes shorter than foliage or not greatly exceeding it: leaves narrow: flowers few, sometimes single, close together at the top of scape, some of them perhaps nearly sessile.

b. Perianth with evident tube, to 1½ cm. or more long, yellow. 1. *H. minor*

bb. Perianth with short tube, 1½ cm. or less long, sometimes not evident, supposedly in darker colors. See page 155.

c. Flowers 1 or 2, to 7 cm. or less long: leaves flat, to 9 mm. broad. *H. nana.*

cc. Flowers to 4 or more, 5 cm. or less long.

d. Leaves flat, to 13 mm. broad: bracts herbaceous. *H. Forrestii.*

dd. Leaves usually folded, 6 mm. broad: bracts inconspicuous. *H. plicata.*

aa. The tall or large-plant Euhemeras: scapes to 1 m. or more: plants strong, making big stools: largest leaves to 5 cm. or more broad: flowers more numerous, well separated in a prominently forking cluster.

b. Branching of scape very marked, occupying distance of 45 cm.: flowers numerous, sometimes as many as 75 or more to a scape before the season is over. See *H. multiflora*, page 156.

bb. Branching or forking of scape occupying the upper 12-18 cm. or so: flowers not more than 10 or 12 to a scape.

c. Color of flower light,—clear yellow or lemon-colored day-lilies, more or less fragrant: spring- and summer-blooming.

d. Flowers wide-opening, with spreading or recurving segments and therefore with a broad appearance; moderately fragrant: diurnal.

e. Scapes weak, wide-spreading or lopping: spring-bloomer (May-June). 2. *H. flava*

ee. Scapes stiff and erect: summer-bloomer (June-July). 3. *H. serotina*

dd. Flowers not wide-opening as seen in day time, therefore with a long and slim appearance and the segments narrow in proportion to length; strongly fragrant: partially crepuscular and nocturnal. 4. *H. citrina*

cc. Color of flower dark,—tawny, fulvous, orange, and reddish day-lilies, not fragrant: summer-blooming. See *H. esculenta*, page 156.

d. Blossoms more or less horizontal or divaricate, on rather weak or spreading scapes, the general color effect orange-red with various bands, stripes or markings. 5. *H. fulva*

dd. Blossoms standing upright on stiff scapes, the color effect burnt-orange or salmon-orange without distinct bands or markings. 6. *H. aurantiaca*

§ 2. DIHEMERA. Scape unbranched, the 2-4 flowers being contiguous at the apex within broad-based involucre-like bracts, sessile or nearly so; segments orange.

a. Segments of flower narrow-oblong and tapering to apex, not much if any recurving: leaves mostly surpassing the scapes.
7. *H. Dumortierii*

aa. Segments broad-spatulate and not long-tapering, becoming strongly recurved: leaves usually somewhat shorter than scapes.
8. *H. Middendorffii*

1. **Hemerocallis minor,** Miller, Gard. Dict. Ed. 8, Hemerocallis no. 2 (1768).

DWARF YELLOW DAY-LILY.—Scape to 45 cm. high, about equaling the leaves which are 5-7 mm. broad and dark deep green: flowers 2 or 3 to 6, some of them nearly sessile, fragrant, yellow, nearly bell-shaped, 6-10 cm. long, the outer segments to about 1 cm. broad and the inner ones broader and more obtuse, the margins membranaceous and veinlets scarcely joined; flower-tube 1¼-2½ cm. long.

FIG. 82. LATE YELLOW DAY-LILY.—Hemerocallis serotina, commonly known as H. Thunbergii. (× about ⅔).

It is impossible as yet to typify this species. Philip Miller's description is not sufficient to separate it from other species and forms now known. Miller compares it with *H. flava,* saying that the leaves are not nearly so long nor more than half the breadth and of a dark green color; the flowers "are nearer the bell shape than those of the other species" (*H. flava* and *H. fulva*) "and stand on shorter foot-stalks"; they are stated to be two or three, whereas Baker (in Journ. Linn. Soc. Bot. xi, 358) gives the number as three to six. I have drawn my brief diagnosis from Miller and Baker.

There is a specimen of *H. minor* in the British Museum from Miller's herbarium and Mr. A. J. Wilmott has kindly examined it for me and made

a sketch. The specimen is nearly rubbed away, however, and little can be made of it, but it may not be the plant we have latterly supposed. *Hemerocallis graminea*, Andrews, Botanists' Repository, t. 244 (1801) is cited as a synonym, but this may be open to doubt. Sims illustrates *H. graminea* in Botanical Magazine in 1805, t. 873. There are two plants on the plate and perhaps not the same. There are probably undeveloped clues as to the identity of Miller's plant, and these must be followed if we are to establish a clear starting point for *H. minor*.

The stock I have grown from commercial sources as *Hemerocallis minor* is all of the Dihemera group.

The species is said by Miller to be Siberian and by Baker to be from eastern Siberia, northern China, and Japan. Miller states that his plant bloomed (near London) the beginning of June and that seeds ripened in early August.

2. **Hemerocallis flava,** Linn. Sp. Pl. Ed. 2, 462 (1762).
Hemerocallis Lilio-Asphodelus var. *flavus*, Linn. Sp. Pl. 324 (1753).

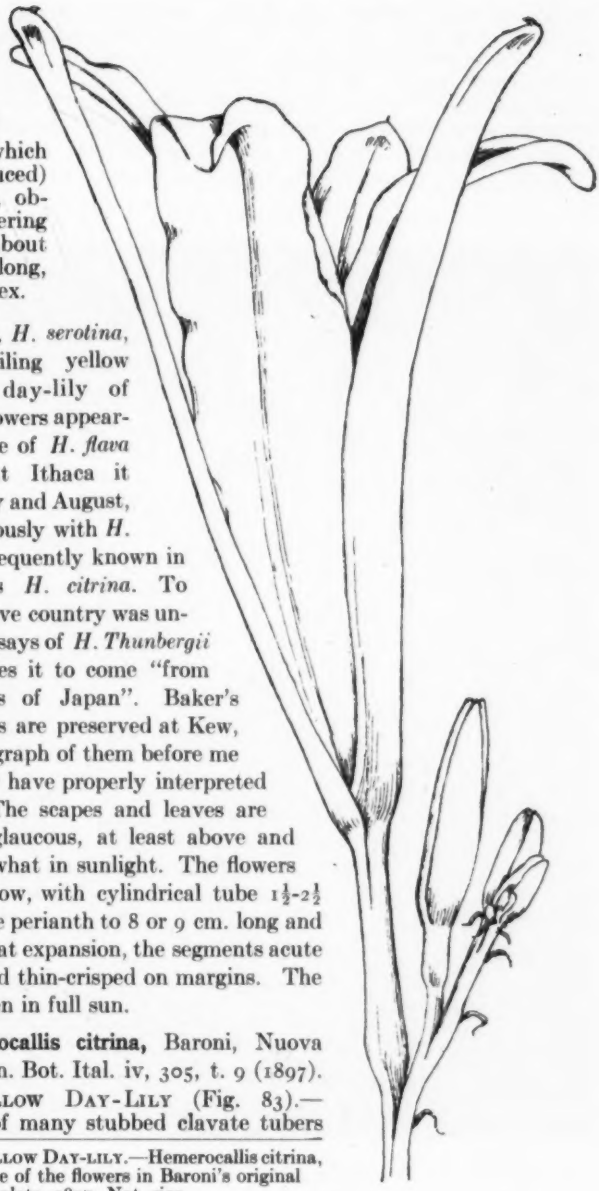
TALL YELLOW DAY-LILY.—Roots partly fibrous and partly with long tuber-like enlargements 5 cm. or more below the crown, the rhizome short: leaves to 1 m. long and the main ones nearly 2 cm. broad, making a good clump of recurving foliage mostly somewhat exceeded by the rather weak scapes that usually bend over with the weight of bloom: flowers in spring, clear lemon-yellow, pleasantly fragrant, mostly short-pedicelled and close together, sometimes in a prominently forking cluster, standing mostly obliquely but sometimes drooping from the bending of the scape; tube cylindrical, to 2½ cm. long, whole perianth to 9 or 10 cm. long, segments acute or nearly so, widely spreading to 8 or 9 cm. in full anthesis; floral bracts lance-pointed, 2½ cm. or less long, not prominent: fruit rather freely produced, broadly obovate-oblong, cross-wrinkled when dried, 3½ cm. long and 2½ thick; seeds shining black, obovoid, angled below, about 6 mm. long.

This species, *H. flava*, is an old and prized citizen of gardens. It is the earliest to bloom of the tall species. At Ithaca, New York, the flowers appear from late May till past the middle of June. The plant is native in Siberia, China and Japan, and probably other parts of temperate Asia; Baker attributes it to France eastward; Ascherson & Graebner to southern France, Italy, Caucasus, western Siberia, Japan. See under *H. fulva*.

3. **Hemerocallis serotina,** Focke, Abhandl. Naturwiss. Ver. Bremen, x, 158 (1889).
Hemerocallis Thunbergii, Baker, Gard. Chron. III, viii, 94 (1890).

LATE YELLOW DAY-LILY (Fig. 82).—Differs from *H. flava* in roots with few and short tuber-like swellings, if any: also scapes stiff and erect, more or less 3-angled: flowers in midsummer, slightly fragrant,

prevailingly smaller, standing erect or ascending, in a more open and elongated cluster: fruit (which is freely produced) much smaller, oblong and tapering below, mostly about 2½ cm. or less long, truncate at apex.



This plant, *H. serotina*, is the prevailing yellow midsummer day-lily of gardens, the flowers appearing when those of *H. flava* are past. At Ithaca it blooms in July and August, contemporaneously with *H. fulva*. It is frequently known in plantations as *H. citrina*. To Focke the native country was unknown; Baker says of *H. Thunbergii* that he believes it to come "from the mountains of Japan". Baker's type specimens are preserved at Kew, and the photograph of them before me shows that we have properly interpreted the species. The scapes and leaves are often thinly glaucous, at least above and showing somewhat in sunlight. The flowers are lemon-yellow, with cylindrical tube 1½-2½ cm. long, whole perianth to 8 or 9 cm. long and 7-8 cm. broad at expansion, the segments acute or tapering and thin-crisped on margins. The flowers are open in full sun.

4. **Hemerocallis citrina,** Baroni, Nuova Giorn. Bot. Ital. iv, 305, t. 9 (1897).

LONG YELLOW DAY-LILY (Fig. 83).—Root-system of many stubbed clavate tubers

FIG. 83. LONG YELLOW DAY-LILY.—Hemerocallis citrina, traced from one of the flowers in Baroni's original plate, 1897. Nat. size.

below the crown: plant stout and large, with much foliage: leaves to 1 m. and more long and 3 cm. or more broad, rather soft and widely spreading, green or sometimes slightly glaucous in sunlight, about equaling the scape: flowers lemon-yellow, very fragrant, to 16 cm. long, closing somewhat in forenoon and appearing very slender, rather close together in a short-dichotomous cluster, in midsummer; tube to 5 cm. long: fruit (as described by Baroni) 3-angled, to 3 cm. long and 1 cm. broad, rugose; seeds black, spherical, irregularly costate, 5 mm. diam.

Fig. 84. Golden Summer Day-lily.—A common form of Hemerocallis aurantiaca, interpreted as one of the stocks of var. major. (× ½).

Apparently *H. citrina* is not common in gardens, the plant often bearing this name being *H. serotina*. I have seen it under the name *H. citrina* var. *Sprengeri*, this designation probably being given to subsequent races or stocks. The material on which the species was founded was collected in northern Shensi, which is the northwestern province of China. Fig. 83 is traced from Baroni's plate, and is natural size. I have not seen *H. citrina* in fruit. It blooms rather late in midsummer.

5. **Hemerocallis fulva,** Linn. Sp. Pl. Ed. 2, 462 (1762).

Hemerocallis Lilio-Asphodelus var. *fulvus*, Linn. Sp. Pl. 324 (1753).

Hemerocallis disticha, James Donn, Hort. Cantab, Ed. 6, 93 (1804) probably, *nomen subnudum*; Sweet, Brit. Fl. Gard. i, t. 28 (1823), a long-tubed flower. *H. disticha*, D. Don, Prodr. Fl. Nepal. 53 (1825) is a different and unidentified plant.

TAWNY or FULVOUS DAY-LILY.—Robust invading plant spreading by stolons from a short rootstock and producing many fusiform-tuberous roots: leaves to 1 m. long and 3½ cm. broad, green, soon much spreading and lopping: scape equaling or exceeding foliage, stiff, forking above: flowers fulvous or rusty-orange, strongly veined and more or less inclined to reddish, not fragrant, widely expanding and measuring 7-9 cm. long and about the same breadth, tube 2-2½ cm. long, segments recurved; summer.

This is the common day-lily, widely naturalized. The nativity of the plant early introduced to cultivation is unknown. Baker accredits the species from France to Japan; Ascherson & Graebner give the range as southern France, Italy, middle and southern Russia, and the trans-Caucasian region. I have taken *H. fulva* in mountains in central China in the wild. Capsules are unknown except as produced by hand-pollination. Stout figures such a pod of one of the forms in Addisonia, xiv, t. 460: oblong, slightly narrow toward base, about 3 cm. long and nearly 2 cm. broad, blunt and retuse at apex. At Ithaca *H. fulva* blooms abundantly in July, running into August.

It is apparent that the problems associated with the indigenous ranges of the day-lilies should receive careful study in connection with the collecting of new material.

The tawny or fulvous day-lily is variable. One of the forms is *H. longituba*, Miquel, Prolusio Floræ Japonicæ, 316 (1866-7) with flower-tube one-third or more the length of the limb. This was made *H. fulva* var. *longituba* by Maximowicz in Gartenflora, xxxiv, 98 (1885), as to name. In the Lu-shan Mountains, China (Province Kiangsi) I have collected *H. fulva* in the wild with tubes to 4 cm. long. *H. fulva* var. *maculata*, Baroni, Nuova Giorn. Bot. Ital. iv, 306 (1897), has flowers marked and banded inside with red-purple.

H. fulva var. **Kwanso,** Regel, Gartenflora, xv, 66, t. 500 (1866).

Double Tawny Day-Lily.—Flowers double: plant usually more robust, with broader foliage (to 5 cm.), and later blooming.

In the text in Gartenflora Regel describes the plant as *Hemerocallis fulva* var. *Kwanso*, but the plate is legended *Hemerocallis Kwanso*. The plant is common in gardens. I have taken it in Rio de Janeiro in thrifty condition.

Fig. 85. Broad Dwarf Day-Lily.—Two heads of Hemerocallis Middendorffii as seen in cultivation, one flower not yet fully expanded. (× ⅔).

6. **Hemerocallis aurantiaca,** Baker, Gard. Chron. III, viii, 94 (1890).

Scape 1 m., equaled by the leaves which are above 2½ cm. broad: flowers 6-8, bright orange, about 8 cm. long, not opening widely; tube cylindrical, about 2 cm. long; outer segments oblong-lanceolate, 2½ cm. broad, thick and firm; inner segments thinner and narrow; summer (in full flower middle of July).

As I do not understand Baker's characterization of this species and have not recognized the plant in any of the cultivated material I have seen, I have drawn the diagnosis from his original account. Baker compares it with the *flava* series although describing it as deep orange. He states that botanically it comes nearest *Dumortierii*, "from which it differs by its produced perianth-tube". As *H. Dumortierii* belongs in another section of the genus (what I have called Dihemera), with unbranched scape, I appealed to Director A. W. Hill of Kew for information and he obligingly had a photograph of the type specimen placed at my disposal. It is not of the *Dumortierii* group, for we know that species. The specimens are very like the type sheet of *H. Thunbergii*. Baker was impressed by the narrow flower, mentioning it twice: "the flower opening less widely than in any of the other species" and "with a large, deep orange, little-opened flower". As Baker knew *H. flava, fulva, minor, Dumortierii, Middendorffii*, these statements are significant.

The species was described from cultivated material and Baker writes: "We do not know its native country, but doubtless it is either Japan or East Siberia".

H. aurantiaca var. **major,** Baker, Gard. Chron. III, xviii, 62, fig. 14 (1895). Garden, xlviii, t. 1041 (1895).

GOLDEN SUMMER DAY-LILY.—A strong stout large plant with many fusiform-tuberous roots, broad leaves (to 4 cm.) and strongly ribbed, flower wide open and 15 cm. across: flowers burnt-orange or salmon-orange, or orange red-tinged, not fragrant, prominently erect or ascending on upstanding scapes to 1 m. tall; tube to 2½ cm. long; segments broad, recurved; flower-bracts long and prominent.

Although this plant is frequent in gardens, I have not seen mature fruit. Stout figures and describes the capsule obtained by cross-pollination: the largest nearly 5 cm. long and 2½ cm. in greatest diameter, ovoid, broadly grooved lengthwise, obtuse and slightly indented at apex. This variety was imported from Japan to England, presumably from cultivated stock. It is a good showy useful midsummer plant; its relation to the originally described *H. aurantiaca* is yet to be determined. I have taken it in bloom in Ithaca June 22 and thence through July.

One cannot be too certain of the particular plant or stock intended by Baker as *H. aurantiaca* var. *major*. Fig. 84 is one to which the

description and illustrations well apply; it is a frequent and striking plant in gardens, giving an abundance of upstanding orange bloom at the same time that the tawny and red-marked flowers of *H. fulva* are in full authesis.

FIG. 86. THE MANY-FLOWERED DAY-LILY.—Herbarium specimen of Hemerocallis multiflora, two-thirds natural size.

7. **Hemerocallis Dumortierii,** Morren, Horticulteur Belge, ii, 195, t. 43 (1834).

NARROW DWARF DAY-LILY (Fig. 80).—Many roots with more or less clavate or long tuber-like swellings: plant dwarf, usually not exceeding 30 cm. high, foliage equalling or exceeding scape: leaves narrow, to 1 cm or less broad, green: scapes unbranched, bearing 2-4 flowers close together at apex that are sessile or essentially so and subtended by broad bracts the lower one of which is particularly prominent: flowers pale orange, fragrant, 6-7 cm. long, rather widely opening but segments not recurving, in spring; tube nearly wanting; outer segments lanceolate-acute, inner broader (to 10-12 mm.), obtusish: fruit about 2½ cm. long and nearly as broad, furrowed, not cross-wrinkled, depressed in apex.

An attractive neat June-flowering (at Ithaca) dwarf day-lily. Some of the stock passing as *H. Dumortierii* belongs with the hybrid derivatives of the Dihemeras; some of that named *H. minor* belongs here. The species is Japanese.

8. **Hemerocallis Middendorffii,** Trautv. & Meyer, Fl. Ochotensis, 94 (1856).

BROAD DWARF DAY-LILY (Figs. 81, 85).—Root fibrous, scarcely if at all swollen: stature of *H. Dumortierii*, differing from that species in the more open flower, much broader spatulate obtuse or very short-acute segments that become more or less recurved, the inner ones 2-2½ cm. broad and with a very obtuse look: fruit obovate-oblong, cross-wrinkled, about 3 cm. long and half as broad.

A handsome June-blooming dwarf, at full anthesis with wide-open flowers 7 or 8 cm. across with clear color, orange-yellow or buff-yellow without markings. Native in the Amur region.

The original description, while full, does not enable one to make out the species very definitely in respect to others. The authors name it *Hemerocallis* (?) *Middendorffii*, but whether the question-mark as to the genus was suggested by the structure of the original material or was the result of the scant and insufficient specimens ("Specimina perpauca et manca") is not stated. The plant was made definitely known in 1866 by Regel with a comment and uncolored full-page plate in Gartenflora (Gartenflora xv, p. 292, t. 522). It is from this plate that the involucre-like bracts are taken in Fig. 81. Regel, however, supposed the *H. Dumortierii* of Morren to be the same, so that the text account probably covers both species.

Whether the *Middendorffii* seen in cultivation has been modified to any extent can be determined only by comparison with newly collected plants from its native region.

There are dwarf early named varieties of day-lilies in the gardens that appear to be hybrids between the Dihemeras and Euhemeras, taking their habit characters and season from the former. They have the Dihemera type of flower for the most part, but the inflorescence is short-branching and the broad bracts therefore much separated. They have the appearance of *Middendorffii* parentage. Among them are Gold Dust, Orange May, Souvenir. The variety Queen of May is perhaps of similar origin, although a larger plant.

OTHER SPECIES OF HEMEROCALLIS

There remain certain species of Hemerocallis not in cultivation or known yet only in botanic gardens. These kinds are placed more or less definitely in the key on pages 145-147, and brief comment may be given them.

Three of them are of a dwarf group from southwestern China. These I have not seen growing but have examined specimens of authoritative collections. *H. nana* is figured by Stapf in Botanical Magazine, t. 8968 (1922), and a key is given to separate the three; it is from this account that the contrasts are drawn on page 146. The species are:

1. *Hemerocallis Forrestii*, Diels, Notes Bot. Gard. Edinb. v, 298 (1912).
2. *Hemerocallis nana*, Forrest & Smith, Journ. Roy. Hort. Soc. xlii, 1, fig. 12 (1916); Notes Bot. Gard. Edinb. x, 39 (1917); Stapf, Bot. Mag. t. 8968 (1922).
3. *Hemerocallis plicata*, Stapf, sub Bot. Mag. t. 8968 (1922).

Two other species are to be entered in this account, to complete it as far as I know them.

4. *Hemerocallis esculenta*, Koidz. in Bot. Mag. Tokyo, xxxix, 28 (1925).

Allied to *H. serotina* (*Thunbergii*) but flower pale red-yellow, segments oblong rather than narrow-oblong: the scape rises to 90 cm.: flowers 9½ cm.

long, 3 or 4 to a scape on pedicels 10-24 mm. long; tube 2-2½ cm. long. It was found in the alpine region of Mt. Asamayama, Japan.

The reason for the name *esculenta* is not stated. The Chinese eat the dried flowers of day-lilies and employ them in medicine (Stuart, Chinese Materia Medica, 204); Forbes & Hemsley (Journ. Linn. Soc. xxxvi, p. 115, 1903) quote Dr. Henry stating that the flowers of *Hemerocallis flava* are eaten with meat.

5. *Hemerocallis multiflora*, Stout, Addisonia, xiv, 31, t. 464 (1929).

Scapes slender, to 1 m. and more, branched above for about 45 cm. and sometimes bearing 75 to 100 deep or dark more or less tinted yellow or cadmium-yellow short-pedicelled flowers with a spread of about 7 cm., tube about 1 cm. long. Described from plants brought from Province Honan, China, and grown at the New York Botanical Garden. As this very floriferous plant is likely to come into cultivation I present a picture of it (Fig. 86) made from an herbarium specimen kindly supplied by Dr. Stout. The many flowers are not borne at one time but over a considerable period, giving the plant a long season of bloom.